

### REMARKS

This is in response to the Office Action mailed on November 15, 2002, and the Notice of Appeal mail May 15, 2003, and received by the U.S. Patent and Trademark Office on May 19, 2003.

Claim 1 is amended. No claims are canceled or added; as a result, claims 1-20 remain pending in this application. The amendments to the claims are fully supported by the specification as originally filed, and no new matter has been added. The amendments are made to clarify the claims and are not intended to limit the scope of equivalents to which any claim element may be entitled. Applicant respectfully requests reconsideration of the above-identified application in view of the amendments above and the remarks that follow.

#### §102 Rejection of the Claims

Claim 1 was rejected under 35 USC § 102(b) as being anticipated by Hamlin et al. (U.S. Patent No. 5,434,972).

Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon* 919 F.2d 688, 16 USPQ 2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S. 904 (1991). Applicant respectfully submits that the Office Action did not make out a *prima facie* case of anticipation.

Amended claim 1 recites “wherein if one of the metarouters is coupled to one of the first level routers, then the one of the metarouters is also coupled to less than two other metarouters, *otherwise the one of the metarouters is coupled to less than three metarouters.*” In contrast,

Hamlin describes and shows network topologies in which the network consists of binary trees. In particular, the Office Action refers to Figure 3 of Hamlin to support the rejection of claim 1. Figure 3 of Hamlin illustrates one binary tree 30 of the network 14 with the processing cells 11 at the leaf positions. Hamlin states that “each node, except the root node 31, is the junction between *three* path segments: an upper segment, a left hand lower segment, and a right hand lower segment.” (*Emphasis Added; See Hamlin, Col. 18, lines 4-7*) In addition, in reference to Figure 3 of Hamlin, the Office Action states “all of the other meta routers, that are

not directly coupled to the first level routers are coupled to *at least two* other metarouters.”

Thus, the network described in Hamlin shows nodes coupled to two or three other nodes.

However, claim 1 as amended recites “. . . otherwise the one of the metarouters is coupled to less than three metarouters.” Therefore, the network in Hamlin does not show each element of claim 1 because Hamlin does not teach or show that if metarouters are coupled to one of the first level routers, then the metarouters are also coupled to zero or one other metarouters, *otherwise the metarouters are coupled to less than three metarouters* and no first level routers.

Applicant respectfully requests the withdrawal of the rejection under 35 USC § 102(b) and the allowance of claim 1.

#### §103 Rejection of the Claims

Claims 2-20 were rejected under 35 USC § 103(a) as being unpatentable over Hamlin et al. (U.S. 5,434,972) in view of Kumar, “Extended Hypercube: A Hierarchical Interconnection Network of Hypercubes,” IEEE 1992.

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). To do that the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would lead an individual to combine the relevant teaching of the references. *Id.*

The *Fine* court stated that:

Obviousness is tested by "what the combined teaching of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 878 (CCPA 1981)). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined *only* if there is some suggestion or incentive to do so." *Id.* (emphasis in original).

The M.P.E.P. adopts this line of reasoning, stating that

In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally

available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

An invention can be obvious even though the suggestion to combine prior art teachings is not found in a specific reference. *In re Oetiker*, 24 USPQ2d 1443 (Fed. Cir. 1992). At the same time, however, although it is not necessary that the cited references or prior art specifically suggest making the combination, there must be some teaching somewhere which provides the suggestion or motivation to combine prior art teachings and applies that combination to solve the same or similar problem which the claimed invention addresses. One of ordinary skill in the art will be presumed to know of any such teaching. (See, e.g., *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988) and *In re Wood*, 599 F.2d 1032, 1037, 202 USPQ 171, 174 (CCPA 1979)).

Applicant respectfully submits that the Office Action did not make out a *prima facie* case of obviousness for the at least the following reasons.

First, the Office Action must provide specific, objective evidence of record for a finding of a suggestion or motivation to combine reference teachings and must explain the reasoning by which the evidence is deemed to support such a finding. *In re Sang Su Lee*, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002). The Office Action stated "it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the clusters, as taught by Hamlin, with the extended hypercube as taught by Kumar in order to implement a class of highly parallel algorithms" which is a mere conclusory statement of subjective belief, so Applicant respectfully submits that the Office Action has not provided objective evidence for a suggestion or motivation to combine the references as indicated for the rejection of claims 2-20.

Second, claim 2-5 depend from amended claim 1 which recites:

“wherein if one of the metarouters is coupled to one of the first level routers, then the one of the metarouters is also coupled to less than two other metarouters, otherwise the one of the metarouters is coupled to *less than three* metarouters.” (*Applicant’s claim 1 as amended.*)

As described above with respect to claim 1 above, the network described in Hamlin shows nodes coupled to two or three other nodes. Thus, claims 2-5 depend directly on claim 1 and are patentable over Hamlin and Kumar for the reasons argued above, plus the elements in the claims

Third, the Office Action must provide a specific reason to support an obvious rejection. *Ex parte Humphreys*, 24 USPQ2d 1255 (B.P.A.I. 1992). The Office Action only stated that independent claim 6 and independent 7 do not recite limitations above the claimed invention set forth in claims 1-5 are therefore rejected for the same reasons set forth in the rejection of claims 1-5 above. However, unlike claims 1-5, independent claim 6 recites:

“a first set of routers for interconnecting the plurality of processors as two-dimensional hypercubes; and

a second set of routers for interconnecting the first set of routers wherein the hypercubes remain intact as the system is expanded and wherein less than all of the routers in the second set of routers are coupled to a router in the first set of routers.”

Also, unlike claim 1-5, independent claim 7 recites:

“a first set of routers for interconnecting a plurality of processing element nodes as n-dimensional hypercubes; and

a second set of routers for interconnecting the first set of routers wherein the n-dimensional hypercubes remain intact as additional processing element nodes are added to the multiprocessor network and wherein less than all of the routers in the second set of routers are coupled to a router in the first set of routers.”

Since the Office Action did not provide a specific reasons to support the rejection of claims 6 and 7, the Office Action has not made a *prima facie* case for obviousness for independent claims 6 and 7.

Claims 8-20 depend directly on claim 7 and are patentable over Hamlin and Kumar for the reasons argued above, plus the elements in the claims.

Applicant respectfully requests the withdrawal of the rejection under 35 USC § 103 and the allowance of claims 2-20.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 349-9592 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

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Date Dec. 19, 2003

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 19 day of December, 2003.

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